

For General Medicine

Topics of seminar: Thermal Radiation

Answer the questions:

1. Describe the basic characteristics of thermal radiation. Specify relationship between them.
2. Specify three kinds of the bodies according their absorptivity.
3. Write thermal radiation laws: Kirchhoff Law, Stefan–Boltzmann Law, Wien’s Displacement Law.
4. Describe human body infrared radiation, specify its spectrum and peak emission wavelength.
5. Describe thermography fundamentals. Explain advantages of this method.

Solve the problems:

1. What is the wavelength corresponding to the maximum of the black body emissivity function at black body temperature of 18000 C?
Answer: 161 nm
2. The maximum of the black body emissivity function varies from $\lambda_1=800$ nm to $\lambda_2= 2400$ nm. In how many times does its radiant emittance change?
Answer: 81 times
3. The temperatures of the two human bodies are 320 C and 300 C, respectively. Calculate the difference between wavelengths of their maximum radiant emittances.
Answer: 31.5 nm

Literature

1. Medical and biological physics for medical students, chapter 19 (pages 172-180).